Claims

1. A device for optically coupling a first optical element (12) to a second optical element (11; 30), comprising:

   a first optical element (12) having a first radiation penetration surface (121);

   a second optical element (11; 30) having a second radiation penetration surface (32) which is opposite the first radiation penetration surface (121);

   a chamber delimited by the first and second radiation penetration surfaces (121, 32) as well as by a circumferentially closed side wall (21) which connects the first and second radiation penetration surfaces (121, 32), said circumferentially closed side wall (21) defining a first section in the first radiation penetration surface and a second section in the second radiation penetration surface, the surface area of the first section being smaller than the surface area of the first radiation penetration surface (121), and the surface area of the second section being smaller than the surface area of the second radiation penetration surface (32);

   a feeding conduit (15a) to the chamber for supplying index-adapting liquid; and

   a discharge conduit (15b) from the chamber for evacuating index-adapting liquid or gas from the chamber.

2. The device according to claim 1, characterized in that the feeding conduit (15a) and the discharge conduit (15b) are configured as channels in the first optical element (12).

3. The device according to claim 1 or 2, characterized in that the chamber is formed, as a whole or in part, by a groove in the first optical element (12).

4. The device according to one of the preceding claims, characterized in that the chamber is formed, as a whole or in part, by a space (25) in an intermediate element (20) which is situated, during optical coupling, between the first and second optical elements (12, 30).

5. The device according to one of the preceding claims, characterized in that the cross-section of the chamber comprises a rectangular center portion and two triangular end portions, with the tips of the triangular end portions respectively facing the feeding conduit (15a) or the discharge conduit (15b).

6. The device according to one of the preceding claims, characterized in that it comprises a tilting means (45, 46) configured such that the means can be tilted into a tilted position in which the feeding conduit (15a) is disposed at a lower level, as viewed in the direction of gravity, than the discharge conduit (15b), and that a supply means (41, 42, 43) is provided which supplies index-adapting liquid to the feeding conduit (15a).

7. The device according to one of the preceding claims, characterized in that the second optical element comprises one or more sensor fields (31).

8. The device according to claim 7, characterized in that the second optical element (11; 30) is an SPR sensor plate and the one or more sensor fields (31) are SPR sensor fields.

9. The device according to claim 7 or 8, characterized in that the one or more sensor fields (31) are disposed on the side of the second optical element (11; 30) facing away from the second radiation penetration surface (32).

10. The device according to one of claims 7 to 9, characterized by a radiation supply means (70-76) arranged to couple radiation into the first optical element (12) such that the entire surface of the one or more sensor fields (31) is illuminated from the body of the second optical element (30).

11. The device according to claim 9 or 10, characterized by a thermostatable block (50) having a first fluid-conducting channel (55) and a second fluid-conducting channel (56), and a gasket (52), said gasket (52) surrounding the one or more sensor fields (31) and cooperating with the thermostatable block (50) so that a space is formed around the one or more sensor fields (32) in which sample liquid can be fed or discharged through the first fluid-conducting channel (55) and/or the second fluid-conducting channel (56).

12. The device according to claim 11, characterized by a means (57, 59) for supplying and discharging sample liquid, said means being connected with the first fluid-conducting channel (55), and the second fluid-conducting channel (56) being designed as an air escape connection.

13. A method for optically coupling a first optical element (12) to a first radiation penetration surface (121) and a second optical element (11; 30) to a second radiation penetration surface (32) which is opposite the first radiation penetration surface (121), said method comprising:

the formation of a chamber delimited by the first and second radiation penetration surfaces (121, 32) and by a circumferentially closed side wall which connects the first and second radiation penetration surfaces (121, 32), said circumferentially closed side wall (21) defining a first section in the first radiation penetration surface and a second section in the second radiation penetration surface, the surface area of the first section being smaller than the surface area of the first radiation penetration surface (121), and the surface area of the second section being smaller than the surface area of the second radiation penetration surface (32); and

filling of index-adapting liquid into the chamber.

14. The method according to claim 13, characterized in that the chamber is formed, as a whole or in part, by a space (25) in an intermediate element (20) which is inserted between the first and second optical elements (12, 30).

15. The method according to claim 13 or 14, characterized in that prior to filling index-adapting liquid into the chamber, the assembly of first optical element (12), second optical element (30) and chamber is brought into a tilted position in which an index-adapting liquid supply point in the chamber is disposed at a lower

level, as viewed in the direction of gravity, than an index-adapting liquid discharge point.

16. The method according to one of claims 13 to 15, characterized in that the second optical element comprises one or more sensor fields (31).

17. The method according to claim 16, characterized in that the second optical element (11; 30) is an SPR sensor plate, and the one or more sensor fields (31) are SPR sensor fields.

18. The method according to claim 16 or 17, characterized in that the one or more sensor fields (31) are disposed on the side of the second optical element (11; 30) facing away from the second radiation penetration surface (32).

19. The method according to claim 18, characterized by the provision of a thermostatable block (50) with a first fluid-conducting channel (55) and a second fluid-conducting channel (56) and the provision of a gasket (52) such that the gasket (50) surrounds the one or more sensor fields (31) and cooperates with the thermostatable block (50) such that a space is formed around the one or more sensor fields (31) in which sample liquid is fed or discharged through the first fluid-conducting channel (55) and/or the second fluid-conducting channel (56).

20. The method according to claim 19, characterized by the supply and discharge of sample liquid via the first fluid-conducting channel (55) and air escape via the second fluid-conducting channel (56).

21. The method according to claim 19 or 20, characterized in that prior to the supply of sample liquid into the space, the array of first optical element (12), second optical element (30), chamber, thermostatable block (50), gasket (52) and space is brought into a tilted position in which a sample liquid supply point in the space is disposed at a lower level, as viewed in the direction of gravity, than a sample liquid discharge point or air escape point.

22. The method according to one of claims 16 to 21, characterized in that the entire surface of the one or more sensor fields (31) is illuminated from the body of the second optical element (30).